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**Kim**

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(54) **AIR VENT DIAL FOR AUTOMOBILE**

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(58) **Field of Classification Search**
None
See application file for complete search history.

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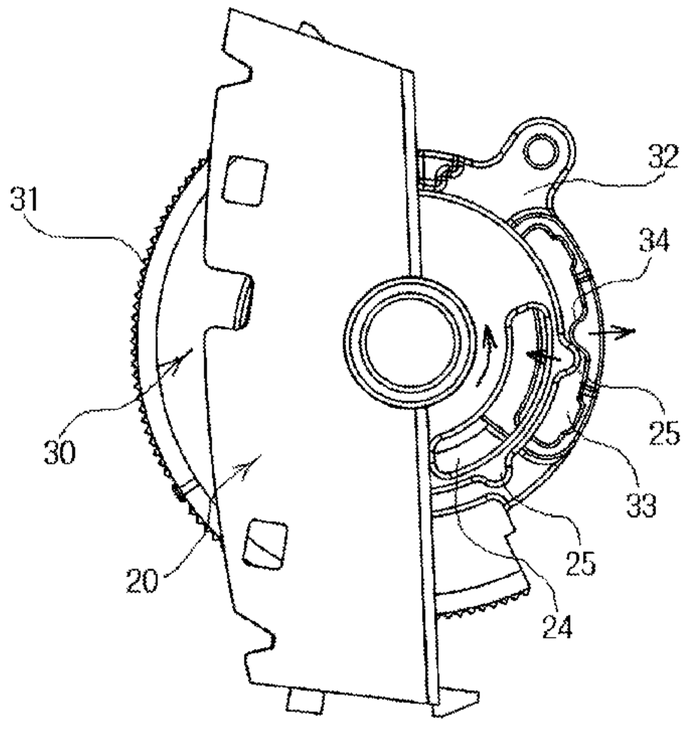
(57) **ABSTRACT**

An air vent dial for an automobile includes an air vent housing having an air path and a damper for opening or closing the air path; a dial housing provided in the air vent housing and having an opening and holding projections; and a dial assembly having a dial knob to be fitted into the opening and a rear fixing plate connected to the damper through a link member to control the opening and closing degrees of the damper. The dial housing has the holding projections at positions corresponding to opening and closing positions of the damper. The dial assembly has a dial elongated hole and fixing projection projecting inwards and contacting the holding projections while being guided and moving along the rear outer peripheral surface of the dial housing at outside of the rear fixing plate having the dial elongated hole.

**2 Claims, 6 Drawing Sheets**



(51) **Int. Cl.**

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|---|---|
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| ***F16K 37/00*** | (2006.01) |
| *G05G 1/10* | (2006.01) |

(52) **U.S. Cl.**

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**FIG. 1**
**Prior Art**

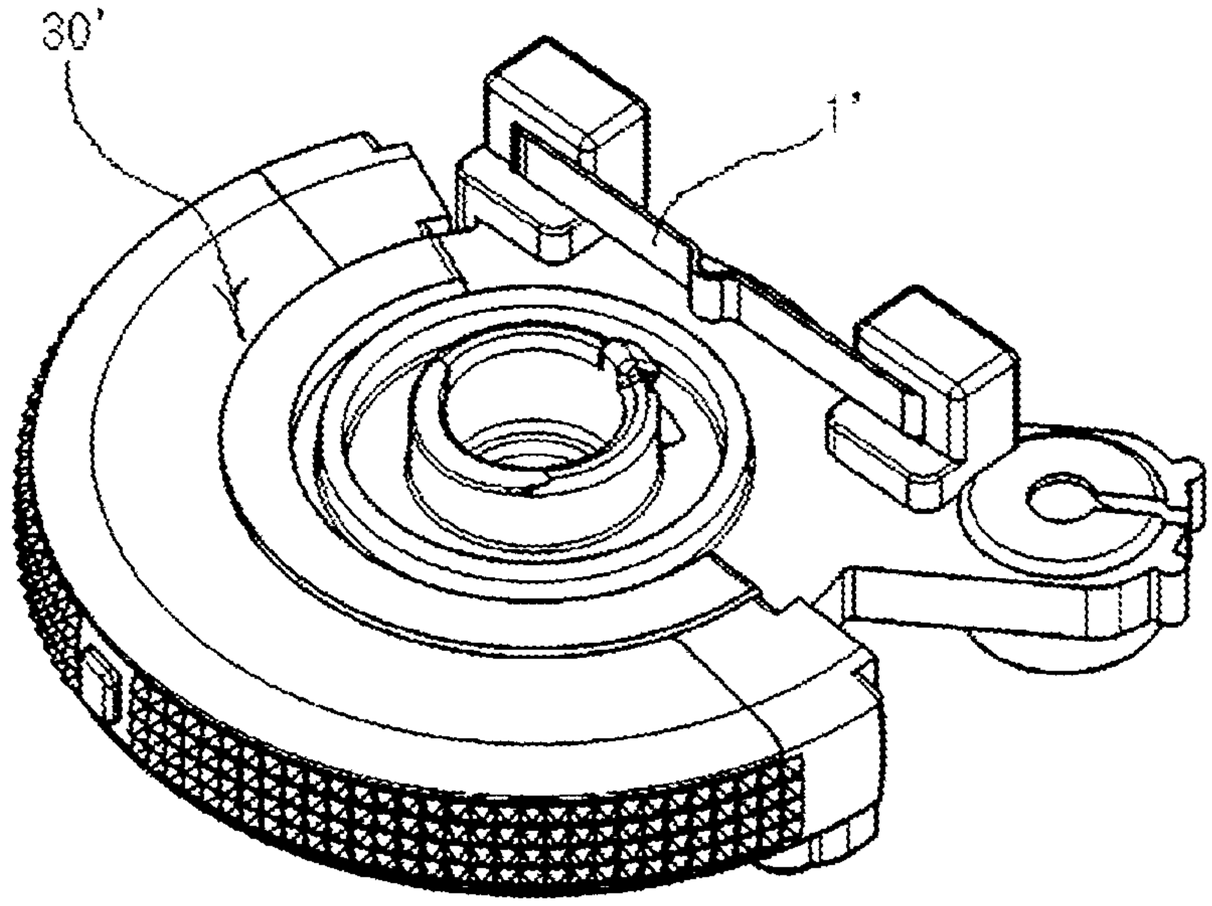



**FIG. 2**
**Prior Art**

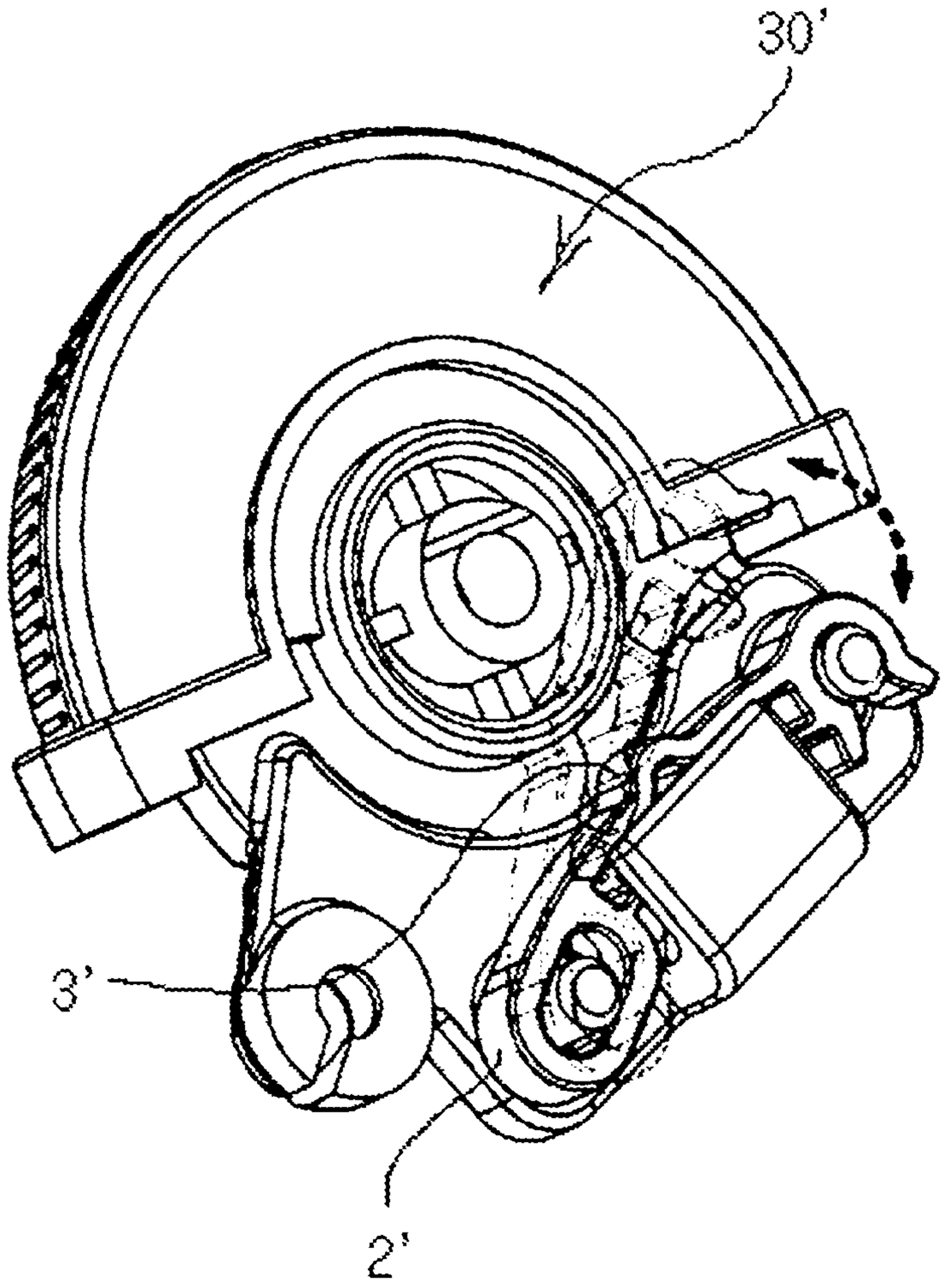


FIG. 3

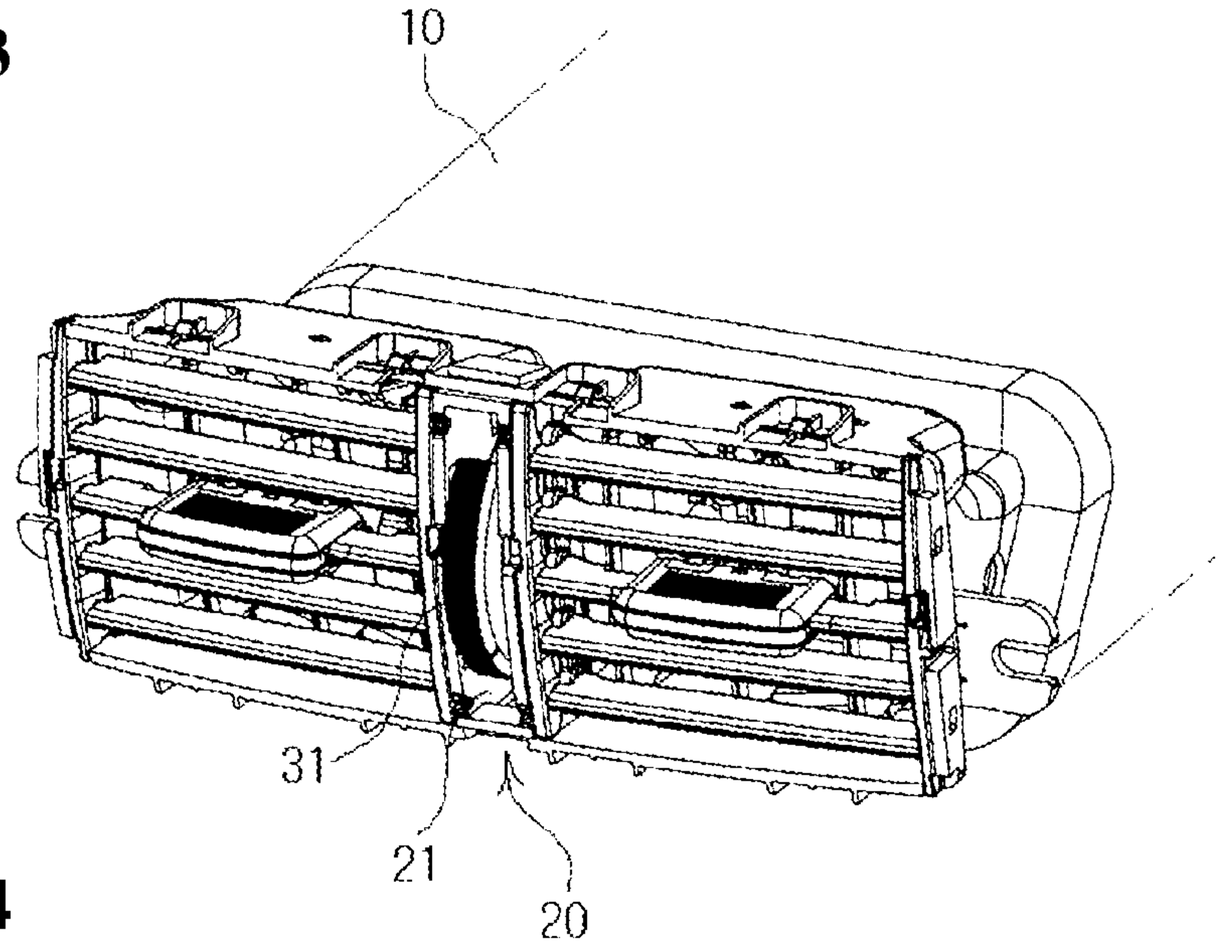



FIG. 4

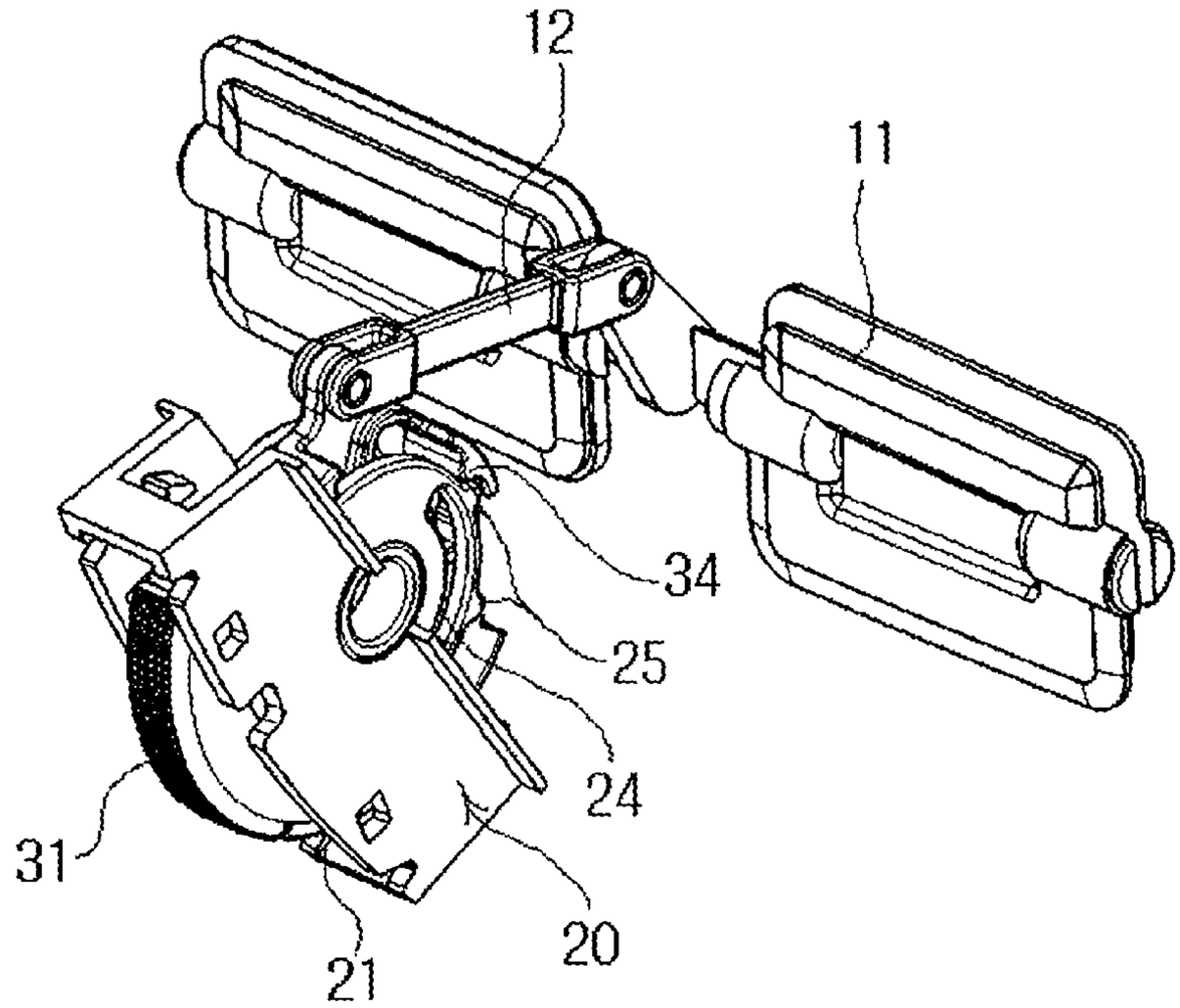


FIG. 5

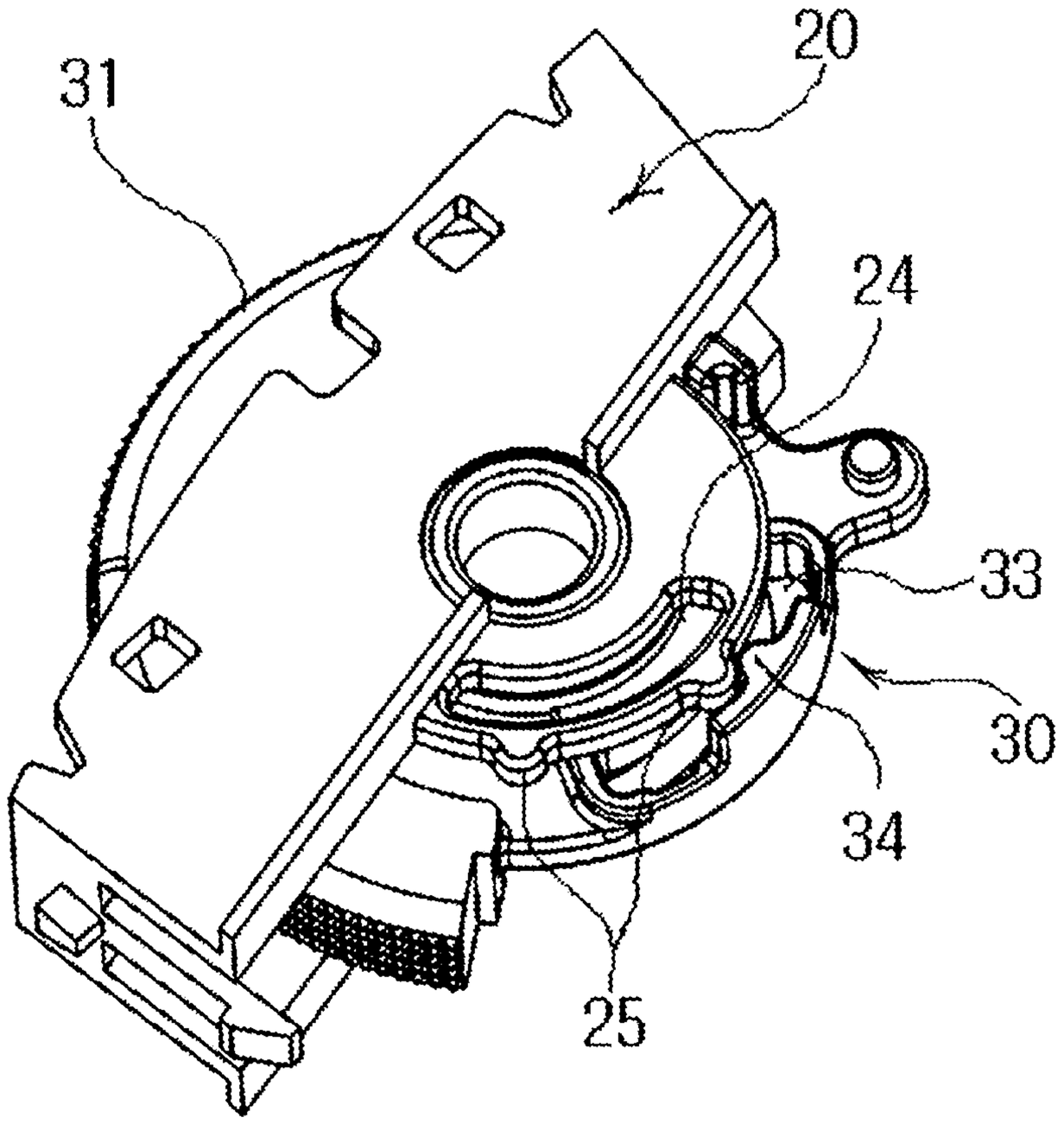


FIG. 6

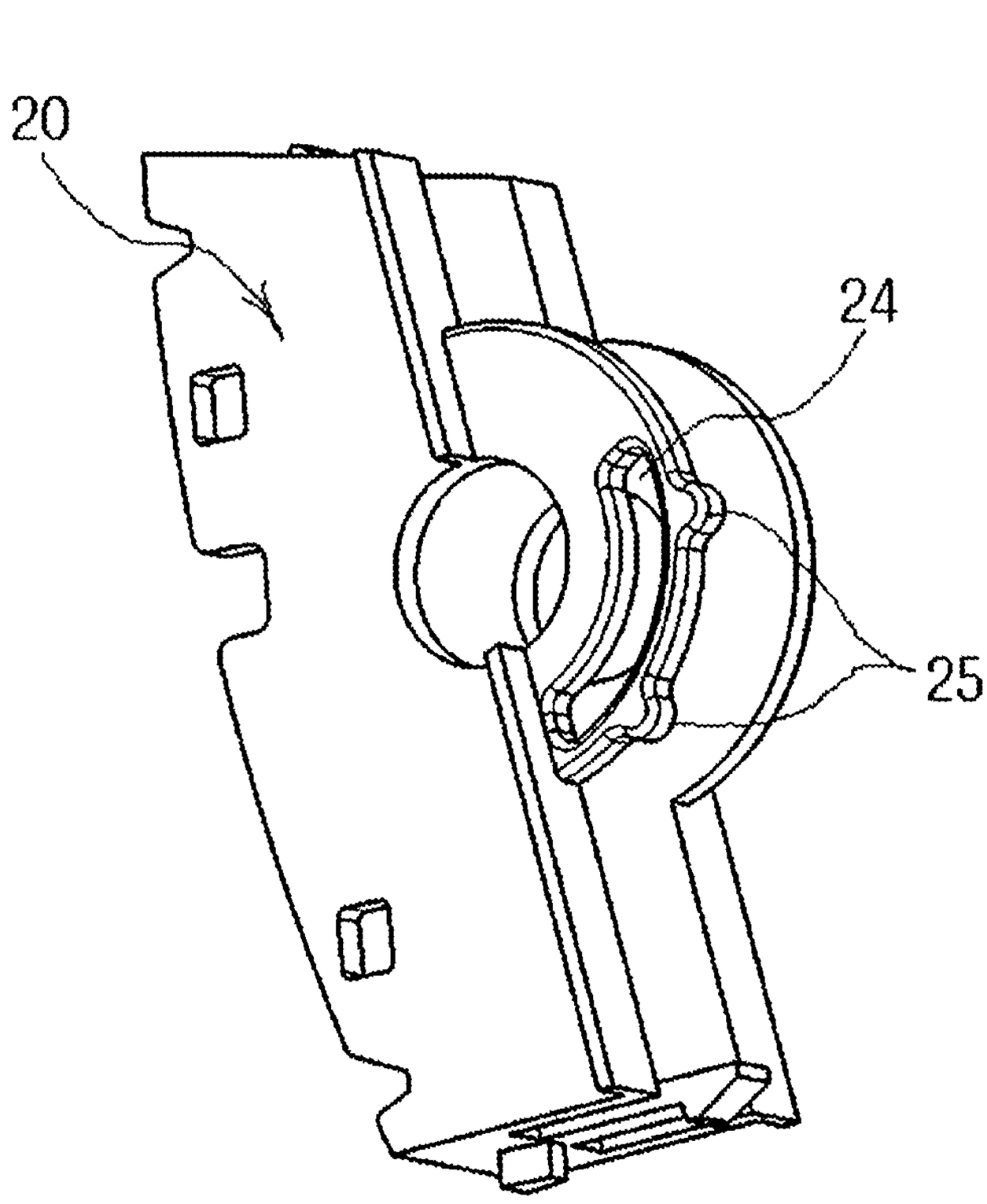


FIG. 7

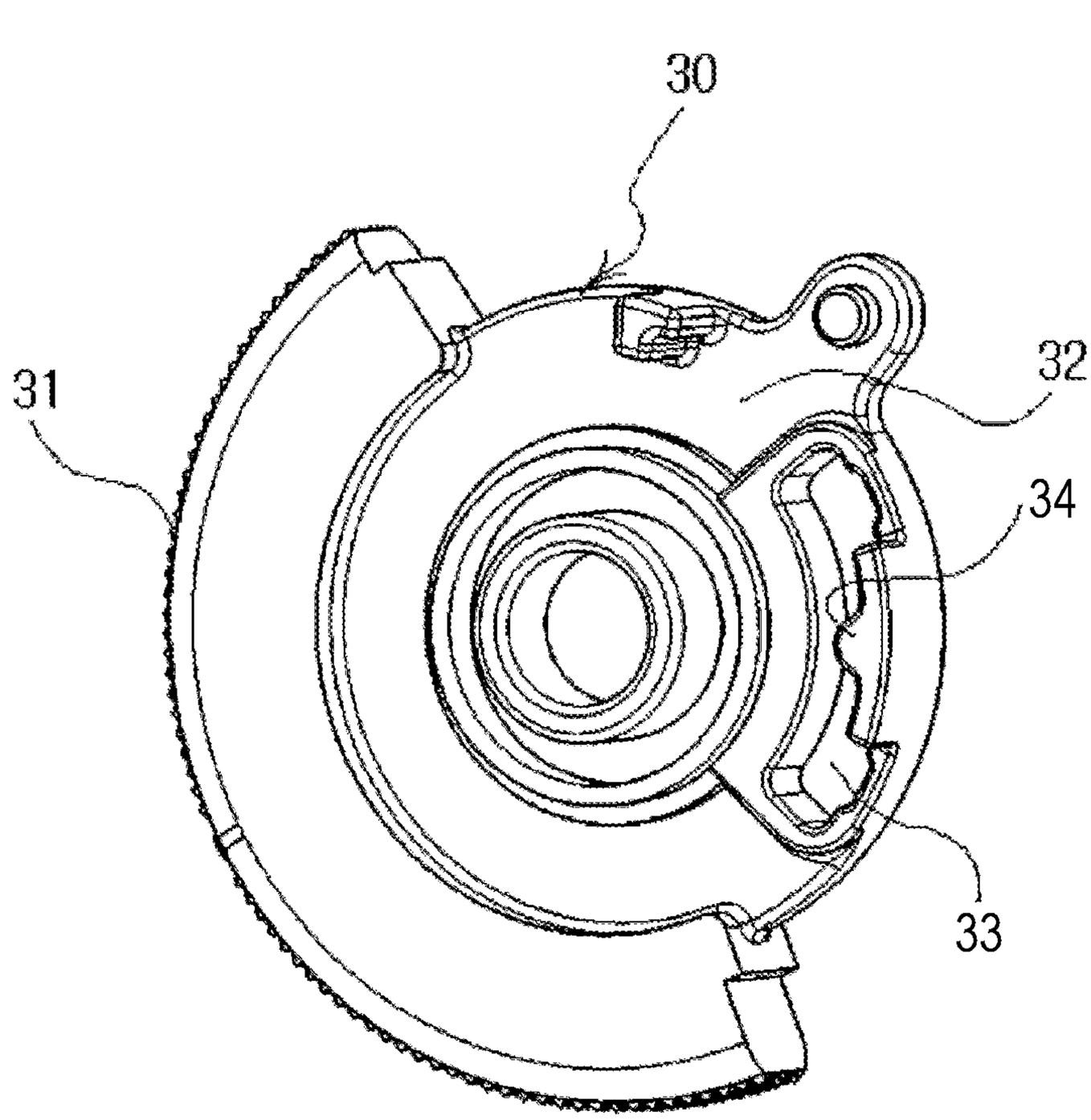
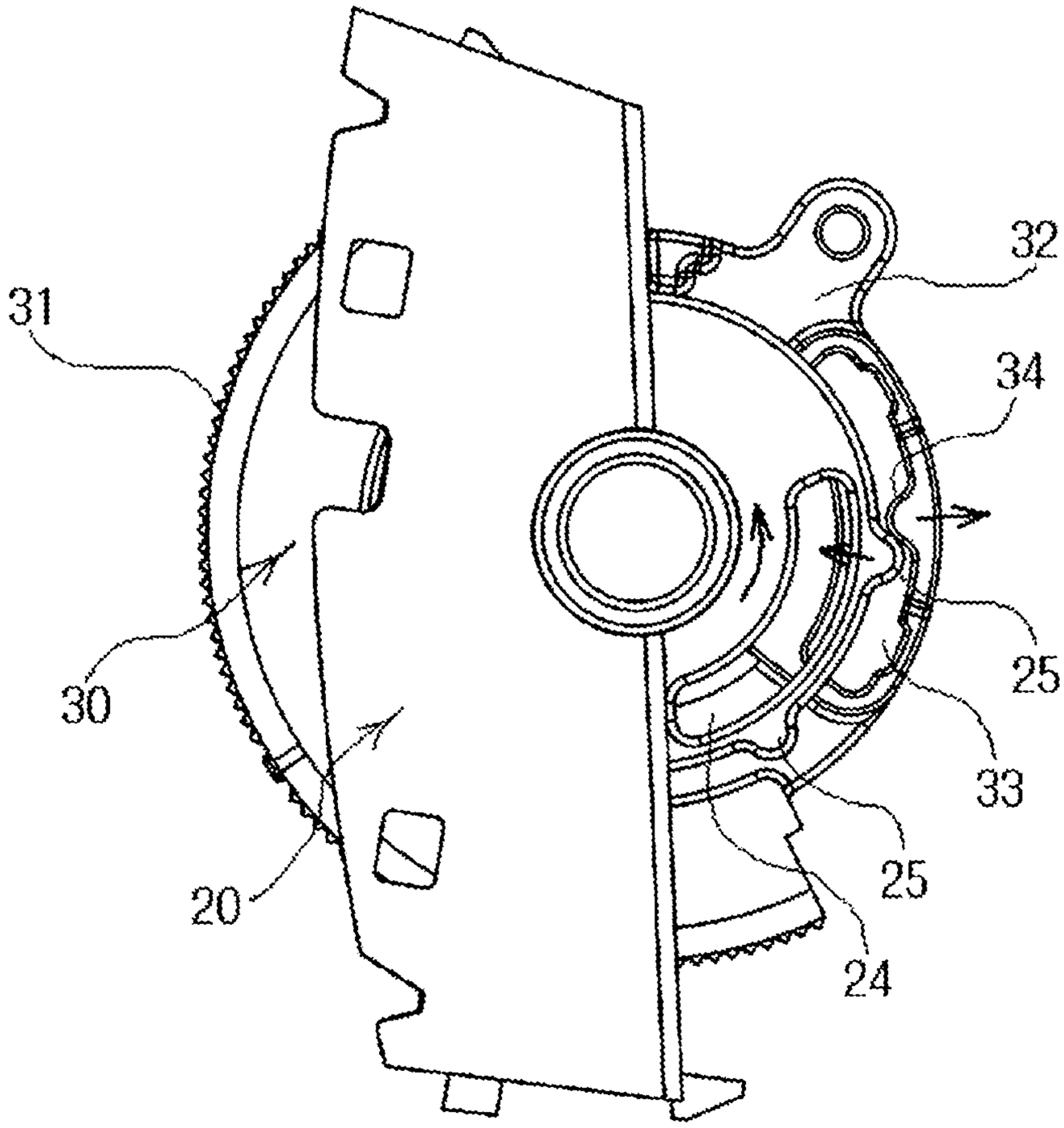


FIG. 8



# AIR VENT DIAL FOR AUTOMOBILE

## TECHNICAL FIELD

The present invention relates to an air vent dial for an automobile, wherein the click phase of a dial assembly is improved with cost reduction and quality improvement.

## BACKGROUND ART

In general, an air vent for an automobile is an air discharge means of an air conditioning system to appropriately maintain the internal temperature of an automobile, thereby controlling the discharge of air by controlling a damper provided to the inside of the air vent.

Further, the damper of the air vent is rotationally provided with a dial for controlling an air flow rate, wherein a means is provided to the rotation structure of the air vent dial such that a user can feel the click phase of the dial.

That is, if the air vent is provided with a damper control part for selectively opening or closing the damper so as to control the flow rate of the air introduced into the inside of the automobile, the damper control part includes the dial assembly and a plurality of link members for controlling the damper and the dial assembly.

In order to improve the click phase of the dial assembly according to a prior art, referring to FIG. **1**, a leaf spring **1'** is coupled such that the leaf spring **1'** is pushed by holding projections provided to a dial housing at the time of the rotation of a dial assembly **30'** so as to apply the click phase. Therefore, the leaf spring **1'** is selectively fixed at a point that a user desires and controls the air flow rate of the damper.

However, the prior art described above, in which the click phase is applied by providing the leaf spring to the dial assembly by inserting the both end portions of the leaf spring into the dial assembly so as to be coupled thereto, has a disadvantage that the leaf spring is pushed by the holding projections and escapes from the dial assembly.

In addition, the leaf spring coupled to the dial assembly has another disadvantage that the coupling process is difficult in terms of the manufacturing method of metal materials, resulting in the increase of the parts cost due to the rise of manufacturing costs.

Therefore, Korean utility model publication no. 20-0462226 discloses a technique for improving the click phase of a dial assembly, wherein an elastic member **40'** made from a plastic material is coupled to a dial assembly **30'**, as shown in FIG. **2**, thereby preventing the rise of manufacturing costs and improving the convenience of assembling work.

That is, the elastic member **40'** of the above technique can be mainly formed in an assembling manner such that one end of the elastic member **40'** is fitted into a pin in a state, in which the other end of the elastic member **40'** is coupled to the dial assembly **30'**, or with projection portion **3'** projecting from the center of a support portion **2'** which connects the both ends such that the projection portion **3'** is pushed by the holding projections of a dial housing.

According to the technique described above, a pin coupling hole of the one end is formed as an elongated hole and a hole of the other end is formed to be open in order to carry out the assembling of the elastic member into the dial assembly. Therefore, the technique described above still has a disadvantage that the pin of the dial assembly and the open hole of the other end are likely to separate by vibration and shock, resulting in the malfunction of a dial.



Further, according to the technique described above, the elastic member is rotated in a state, in which the one end is first pin-coupled and then the other end is fitted. Therefore, a space is required for the rotation of the elastic member in the dial assembly, resulting in the enlargement of parts and the increase of the number of required parts, thereby making the assembling work complicated.

## PRIOR ART DOCUMENT

### Patent Document

Patent Document 1: Korean Utility Model Publication No. 20-0462226—vehicle air vent (registered on 27 Aug. 2012)

## DISCLOSURE OF INVENTION

### Technical Problem

The present invention is derived in consideration of the above disadvantages and any other problems and has an objective to provide an air vent dial for an automobile, wherein the structure of a dial assembly is simplified while providing the click phase according to the rotation of a dial such that a user can sufficiently recognize the opening and closing states of an air vent.

The present invention has another objective to provide an air vent dial for an automobile, wherein the click phase is provided by the coupling of a dial assembly and a dial housing, thereby simplifying the assembling work and reducing the time required for the assembling work so as to improve workability.

### Solution to Problem

In order to achieve the above and any other objectives of the present invention, an air vent dial for an automobile comprises:

an air vent housing **10** having an air path provided to an inside portion and a damper **11** rotationally provided to the air path so as to open or close the air path;

a dial housing **20** provided to the air vent housing **10** and having an opening **21** provided at a front portion thereof and holding projections **25** provided to an outer peripheral surface at a rear portion thereof; and

a dial assembly **30** rotationally coupled to the dial housing **20** and having a dial knob **31** provided to a front portion so as to be fitted into the opening **21** and exposed to the outside and a rear fixing plate **32** connected to the damper **11** through a link member **12** so as to control opening and closing degrees of the damper **11**,

wherein the dial housing **20** has a housing elongated hole **24** formed at a rear body and holding projections **25** respectively formed at positions corresponding to the opening and closing positions of the damper **11** along a rear outer peripheral surface, and

wherein the dial assembly **30** has a dial elongated hole **33** formed on the rear fixing plate **32** and a fixing projection **34** projecting inwards and coming into contact with the holding projections **25** while being guided and moving along the rear outer peripheral surface of the dial housing **20** at the outside of the rear fixing plate **32** having the dial elongated hole **33**.

Further, the holding projections **25** of the housing **20** move with elastic force in the direction of the housing elongated hole **24**, and the fixing projection **34** of the dial

assembly **30** moves with elastic force in the outside direction of the dial elongated hole **33**.

## Advantageous Effects of Invention

According to the present invention in the above configuration, it is possible to provide the click phase for a user to accurately recognize the opening and closing states of the air vent according to the rotation of the dial knob simply by coupling the dial housing and the dial assembly.

Therefore, the user can accurately recognize the air blowing state of the air vent while rotating the dial knob. In addition, the dial assembly and the dial housing are made from plastic materials by injection molding, thereby simplifying the manufacturing process and reducing the manufacturing costs as well as simplifying the assembling work and reducing the assembling time.

## BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a perspective view showing the configuration of a prior art dial assembly,

FIG. **2** is a perspective view showing the configuration of a prior art dial assembly,

FIG. **3** is a perspective view showing the configuration of an air vent according to the present invention,

FIG. **4** is a perspective view showing a coupling state of an air vent according to the present invention,

FIG. **5** is a perspective view showing a coupling state of an air vent according to the present invention,

FIG. **6** is a perspective view showing a dial housing according to the present invention,

FIG. **7** is a perspective view showing an operation state of a dial assembly according to the present invention, and

FIG. **8** is a side view showing an operation state of the dial assembly according to the present invention.

## BEST MODE FOR CARRYING OUT THE INVENTION

Hereinafter, embodiments of the present invention will now be described with respect to the configuration in detail with reference to the accompanied drawings.

An air vent dial for an automobile according to the present invention is derived to reduce parts cost and improve quality through the improvement of the click phase of the dial assembly.

Referring to FIG. **3** to FIG. **5**, a dial knob **31** is assembled into the front surface portion of an automobile so as to be exposed, and a damper **11** is rotationally provided to an air path in an air vent housing **10** and opens or closes the air path by using the link member **12** assembled into the rear portion of the dial knob **31**.

The dial assembly **30** including the dial knob **31** is coupled to the dial housing **20**, and the dial housing **20** is assembled and fixed in the air vent housing **10** such that the damper **11** rotates in association with the movement of the link member **12** by the operation of the dial knob **31**.

Now, explaining the above structure in more detail, the air vent housing **10** is provided with the air path therein such that the damper **11** is rotationally provided to the air path.

The dial housing **20** is provided to the air vent housing **10** and has an opening **21** formed at the front portion thereof and holding projections **25** provided to the rear outer peripheral surface thereof.

In addition, the dial assembly **30** is rotationally coupled to the dial housing **20** and has the dial knob **31** at the front portion thereof so as to be fitted into the opening **21** and exposed to the outside and a rear fixing plate **32** of which one side is connected to the damper **11** through the link member **12** so as to control the opening and closing degrees of the damper **11**.

According to the present invention, by using the dial assembly **30** and the dial housing **20** and by simply coupling these two parts, a user can recognize the click phase at the time of operating the dial knob **31**, thereby reducing the number of required parts and man-hour.

First of all, referring to FIG. **6**, the dial housing **20** has a housing elongated hole **24** in a rear body and the holding projections **25** respectively formed at positions corresponding to the opening and closing positions of the damper along the rear outer peripheral surface thereof.

That is, the holding projections **25** are respectively formed to protrude from the rear outer peripheral surface thereof at positions corresponding to the opening and closing positions of the damper **11** along the rear outer peripheral surface thereof.

Further, the dial housing **20** is coupled and fixed to the air vent housing **10** and has the opening **21** formed in the front portion and a hole formed in the center portion so as to be coupled with the dial assembly **30**.

In addition, referring to FIG. **7**, the dial assembly **30** is rotationally coupled to the dial housing **20** in the center portion thereof and has the dial knob **31** provided to the front portion thereof and fitted into the opening **21** so as to be exposed to the outside, the rear fixing plate **32** extending from the rear portion thereof and provided with an elongated hole **33** and the fixing projection **34** projecting inwards and coming into contact with the holding projections **25** while being guided and moving along the rear outer peripheral surface of the dial housing **20** at the outside of the rear fixing plate **32** having the dial elongated hole **33**.

Further, the dial assembly **30** is coupled to one end of the link member **12** connected to the damper **11** at one side such that the link member **12** moves in response to the rotation of the dial assembly **30** so as to control the opening and closing degrees of the damper **11**.

Meanwhile, the holding projections **25** of dial housing **20** move with elastic force in the direction of the housing elongated hole **24**. Further, the fixing projection **34** of the dial assembly **30** is formed on the outside of the rear fixing plate **32** and has the dial elongated hole **33** in the inside direction of the fixing projection **34**, such that the outside of the rear fixing plate **32** provided with the fixing projection **34** is formed to have relatively small thickness and elasticity so as to move with elastic force in the outside direction.

Therefore, referring to FIG. **8**, if the dial knob **31** is rotated in a state, in which the dial assembly **30** is coupled to the dial housing **20**, the fixing projection **34** of the rear portion rotates along the outer peripheral surface of the dial housing **20** and comes into contact with the holding projections **25** of the opening or closing positions.

At this time, if the dial knob **31** is further rotated, the fixing projection **34** and the holding projections **25** are pushed by each other and the fixing projection **34** passes the holding projections **25**.

That is, the holding projections **25** of the dial housing **20** are pushed with the elastic force in the direction of the housing elongated hole **24**, and the fixing projection **34** of the dial assembly **30** is pushed with the elastic force in the outside direction as the dial assembly **30** has the rear fixing plate **32** which has the elastic force by the dial elongated hole **33**.

Therefore, in a state, in which the dial knob **31** is further rotated such that the fixing projection **34** which is pushed back by the elastic force passes the holding projections **25**, the fixing projection **34** and the holding projections **25** are restored to the initial states thereof and the user can feel the click phase.

Meanwhile, the dial housing **20** and the dial assembly **30** are made from plastic materials and the fixing projection **34** and the holding projections **25** have the elastic force by the housing elongated hole **24** and the dial elongated hole **33** such that no noise can be generated in the process of contact and deformation.

Therefore, selective fixing can be realized at a position desired by the user at the time of rotating the dial knob **31** such that the user can control the air flow rate according to the opening and closing of the damper **11**.

Hereinafter, embodiments of the present invention structured as above will now be explained in more detail.

First, if the user rotates the dial knob **31** which is axially coupled to the dial housing **20**, the link member **12** assembled with the rear fixing plate **32** of the dial knob **31** moves together therewith.

At this time, the other end of the link member **12** is connected to the damper **11** such that the damper **11** in the air vent housing **10** rotates by the rotation of the dial knob **31** so as to open or close the air path.

In addition, the fixing projection **34** is in a contact state with the body rear outer peripheral surface of the dial housing **20** and moves along the body rear outer peripheral surface of the dial housing **20** in a state, in which the dial assembly **30** according to the present invention is coupled and fixed to the dial housing **20**.

That is, the fixing projection **34** rotates together with the dial knob **31** in a state, in which the fixing projection **34** is in contact with the outer peripheral surface of the dial housing **20**, and passes the holding projections **25** which are formed to project from the outer peripheral surface of the dial housing **20** at the position where the damper **11** is closed.

At this time, the fixing projection **34** and the holding projections **25** are formed to have the elastic force so as to come into contact with each other and be pushed back from each other. Therefore, the fixing projection **34** passes the holding projections **25** and is restored.

Therefore, the user can recognize the click phase indicating that the damper **11** is closed when rotating the dial knob **31** and can also recognize the click phase as the fixing projection **34** passes the holding projections **25** even when the damper **11** is opened by rotating the dial knob **31** in the opposite direction.

Herein, it is preferable that the holding projections **25** of the dial housing **20** and the fixing projection **34** of the dial assembly **30** are formed to be rounded such that the holding projections **25** can naturally pass the fixing projection **34**.



The embodiments described above are to be understood as a few illustrative examples of the present invention and the present invention is not limited to the embodiments and the drawings. It will be understood by those skilled in the art that various modifications, combinations and changes may be made to the embodiments without departing from the scope of the present invention.

## BRIEF EXPLANATION OF REFERENCE SYMBOLS

**10**: Air vent housing **11**: Damper
**12**: Link member **20**: Dial housing
**24**: Housing elongated hole **25**: Holding projections
**30**: Dial assembly **31**: Dial knob
**32**: Rear fixing plate **33**: Dial elongated hole
**34**: Fixing projections

The invention claimed is:

**1**. An air vent dial for an automobile, comprising:

an air vent housing having an air path at an inside portion and a damper rotationally provided at the air path so as to open or close the air path;

a dial housing provided in the air vent housing and having an opening formed at a front portion thereof; and

a dial assembly rotationally coupled to the dial housing and having a dial knob provided at a front portion of the dial assembly so as to be fitted into the opening and exposed to outside, and a rear fixing plate connected to the damper through a link member to control opening and closing degrees of the damper,

wherein the dial housing further comprises

a housing elongated hole formed in a rear body, and

holding projections formed respectively at a rear outer peripheral surface corresponding to opening and closing positions of the damper along the rear outer peripheral surface of the dial housing, and

wherein the dial assembly further comprises

a dial elongated hole formed in the rear fixing plate, and

a fixing projection projecting inwards and contacting the holding projections while being guided and moving along the rear outer peripheral surface of the dial housing outside the rear fixing plate.

**2**. The air vent dial for an automobile according to claim **1**, wherein the holding projections of the housing move with an elastic force in a direction of the housing elongated hole, and

the fixing projection of the dial assembly moves with an elastic force in an outside direction of the dial elongated hole.

* * * * *